REFERENCE DEPT.

AVIATION

The Oldest American Aeronautical Magazine

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Through the Clouds in a Jenny

Orville Morrow

VOLUME XXI

NUMBER 7

SPECIAL FEATURES

HISTORY OF THE AERONAUTICAL ENGINE

THE START OF THE COMMERCIAL AIRPLANE RELIABILITY TOUR

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Aeronautic Department

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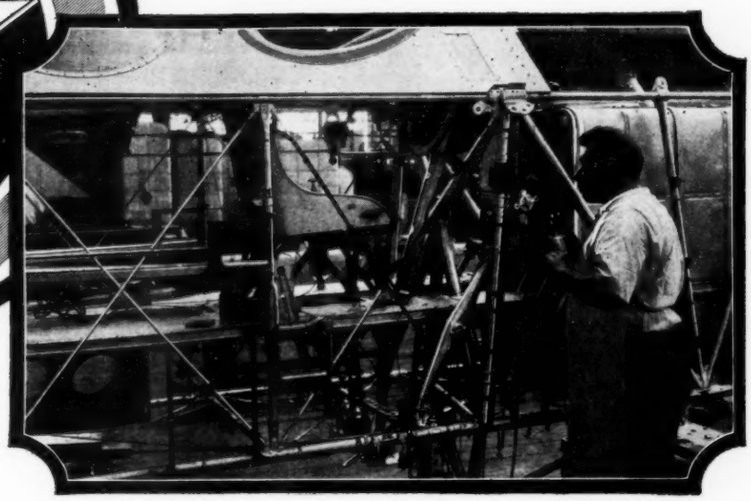

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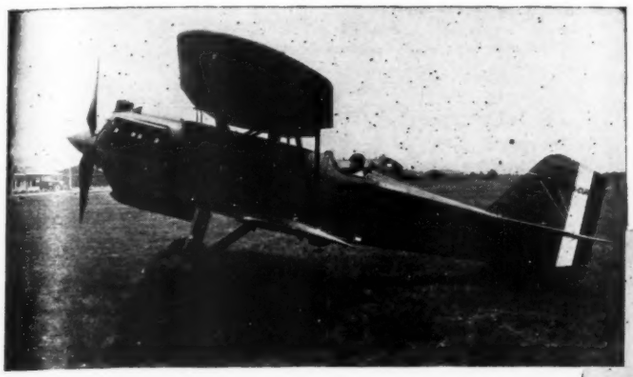
The Curtiss "Hawk" Series

FOR PURSUIT TRAINING
WITH THE 180 H.P. WRIGHT MOTOR



FOR PURSUIT FIGHTING
WITH THE 440 H.P. CURTISS D-12 MOTOR

The Curtiss "Hawk" pursuit aeroplane is now available to the Army Air Service as an advanced training machine, with the 180 H.P. Wright E-2 motor substituted for the regular 440 H.P. Curtiss D-12 motor. Except for this power-plant change, the entire ship is identical with the regular P-1 "Hawk".

This new combination, which is known as the AT-4, has resulted in a machine that is peculiarly well-fitted for advanced training purposes.

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PERFORMANCE: The AT-4 has a high speed in excess of 130 m.p.h., a ceiling of over 15,000 feet with manoeuverability similar to the P-1, acknowledged the most manoeuverable ship in the world.

But the AT-4 is more than a training plane. The entire power-plant can be detached by the removal of four taper pins, and a regular D-12 power-plant substituted. Thus, in time of emergency, the AT-4 can be instantly converted into a standard P-1 "Hawk", ready to take its place in our first line of national defense.

The Navy advanced training problem can be similarly solved by the use of the 200 H.P. Wright J-5 motor in the Navy type of the "Hawk" seaplane.

THE CURTISS AEROPLANE AND MOTOR CO., INC.
CLINTON AVE. GARDEN CITY, N. Y.

Curtiss

AUGUST 16, 1926

AVIATION

VOL. XXI. NO. 7

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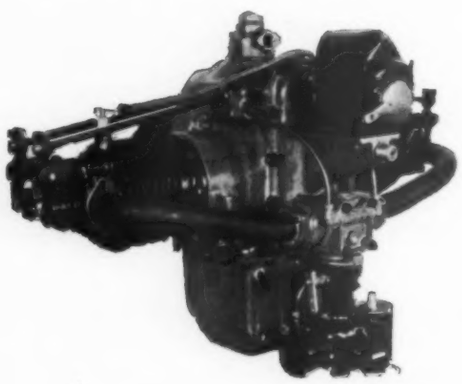
SCINTILLA



The Wright-Morehouse 80 cu. in. 2 cyl. air cooled light plane engine. Develops 28 h.p. at 2500 r.p.m. Weight dry 85 lb. Ignition is supplied by one Type MG 2 SCINTILLA Aircraft magneto.

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VOL. XXI AUGUST 16, 1926 No. 7

Correspondence Schools

JUST AS the war surplus material is being gradually used up, so also the number of pilots and mechanics who were trained during the War is gradually becoming more limited and a new supply of men must be made available.

Encouraging young men to enter aviation and an intelligent training for them is a matter of great interest not only to the civilian operators but also to the government. Among the various agencies which are recruiting the younger generation for aviation, and giving them training, the correspondence school is beginning to take an important part.

No correspondence school claims to turn out a pilot or thoroughly trained mechanic, but they do claim to give a good theoretical training in the fundamentals of aeronautics and aviation mechanics. The man who has gone through the course of a reliable aeronautical correspondence school and has really studied and remembered what he has read, will not only progress faster if he goes into aeronautics but will also be more valuable to the trade than if he had to learn everything by asking questions or from his own observations.

The correspondence school idea has taken a very firm hold in the United States, and courses have been worked out for practically all the trades. The technique of instruction through correspondence has reached a high state of development, and though aviation is a new science, there is much standard practice in repair and maintenance work which is no more difficult to learn than in any other trade.

The reliable and well conducted correspondence school is serving an excellent purpose in this field.

The Industry and Engineering

PROGRESS IN the safety and efficiency of planes has been made both by correcting errors in machines which have actually been flown, and by developments worked out through research in the laboratory or wind tunnel. A consideration of which these two agencies has been foremost in the matter of development, is like the discussion as to which came first—the chicken or the egg—but there is no questioning the fact that each method is absolutely necessary to the other. There is also no doubt that there would have been more aeronautical progress had the theoretical and practical ends of aviation been in closer communication with each other. For this reason the joint meeting of the N.A.C.A. and the engineers representing the aeronautical industry which was held in June was more than a matter of passing interest, for it represented a step in the right direction.

What the industry needs more than anything is engineering. Yet there are few aeronautical firms which have sufficient funds to do any real research work or to do more than carry on a conservative development of a given design problem. When the engineer of some manufacturing firm does go to a wind tunnel, he usually goes with an airplane design to be tested or with some specific problem to be solved. There is, as a rule, no time for the discussion of theory and the larger problems are not touched upon. More frequent meetings between the men who work in laboratories and the men who actually design planes would stimulate the interchange of ideas, and each would go back to his work with a somewhat broader outlook.

The engineer who works for a commercial firm which must make money gradually gets into a conservative frame of mind where he can think only along lines of improvement in detail. If he designs a plane which follows the lines of his previous plane but with the improvement suggested by practical experience he is almost sure to be successful, whereas, if he branches out along radical lines he is quite likely to produce a very expensive failure. The man who works in the laboratory is, on the other hand,apt to get into the habit of thinking along lines of theoretical aerodynamic development and to ignore the present-day limitations of the manufacturer. Meetings at which representatives of the manufacturers and those working in our many wind tunnels would meet and read papers, discuss problems and generally get acquainted, would be of real value, for personal contact brings results which cannot be accomplished by the written word.

Competition That Hurts

THERE IS probably nothing that is more irritating to the pilot who has spent much time, effort and money in getting a local landing field and a plane to operate than to have some barnstorming pilot come to town and take the passenger business away from him. The visiting pilot gets the reward of the hard work done by the local flier who has interested the town in aeronautics. The barnstormer has the advantage of not having to establish and maintain a reputation. He can indulge in stunts and trick flying to draw the crowd and, when he has carried the passengers interested by this sort of exhibition flying, he moves away, often leaving a trail of unpaid bills.

Such visits are very hard on the newly established pilot but competition of a similar sort exists in all other fields and is not a matter which can be handled by law. Only a sense of decency can prevent the barnstormer poaching on the other man's property. It would save friction and wasted effort if pilots would respect each others territory, especially where a pilot is newly established in a locality. After a pilot has been established in a locality for some time he will have built up a reputation for good flying and a well maintained airplane and there will be less liability of the barnstormers being able to take much business away from him. The visiting pilot may have methods of getting business from which the local pilot may learn a considerable amount and a little competition may not be altogether harmful.

History of the Aeronautical Engine

Basic Features Almost Unchanged Through Development Years.

By C. FAYETTE TAYLOR

Massachusetts Institute of Technology

LIKE MOST of our mechanical conveniences, if I may take the liberty of classifying it as such, the aeronautical engine has an interesting history, unfamiliar alike to the layman and to the engineer. It is with the hope that such a history, in very brief form, will be of interest that this article is written.

As far as can be ascertained, the first use of mechanical power in flight was by Leonardo da Vinci, (1454-1512), who is said to have built successful model helicopters actuated by steel springs. It is interesting to remember that the elastic spring remains the generally accepted form of motive power for airplane models. The first application of heat in power flying appears to have been made by W. H. Phillips (British) in 1842, in the form of a model helicopter employing steam jet reaction to turn the propellers. In 1848 indoor flights were made by a model airplane propelled by a steam engine, constructed by J. S. Stringfellow (British). Langley built several successful steam driven models, the first of which flew in 1896.

First Lighter-Than-Power Flight

Power flying with lighter-than-air machines started with a successful flight by Haenlein, (Germany), using a balloon propelled by a 6 hp. engine, operating on the Lenoir cycle with balloon gas as fuel. The first gasoline engine of the modern type to fly was a German Daimler, using benzene fuel, mounted in a dirigible constructed by Baumgarten and Wolfert, in 1879. These two men were probably the first martyrs to power flight, having been killed by a benzene vapor

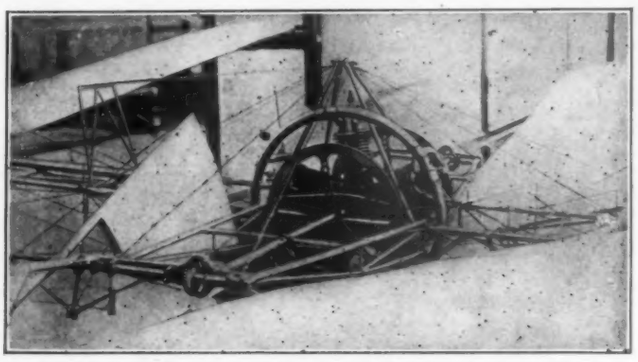


Fig. 1. Manly five-cylinder radial in Langley 1/4 size model.

fire which occurred in their dirigible 18 years later. At least in one instance (Tissandier, France, 1884) an electric motor was used in lighter-than-air flight, but it has remained for the gasoline engine to make possible the initial success and subsequent development of the airplane.

The first heavier-than-air flight of an internal combustion engine was that made by Langleys' quarter-size model in August 1903, only three months before the Wright Brothers' first flight. The engine used is shown in Fig. 1*. It was designed by Charles M. Manly, who supervised much of the mechanical design of Professor Langley's machine. The engine is a five cylinder air-cooled radial of 2 1-16 in. bore and 2¾ in. stroke and developed 3.2 hp. at 1800 r.p.m. for a short period. Its weight with carburetor, ignition and small storage battery was only 10 lb. With this engine, the model made a steady flight of short duration, the engine finally succumbing to carburetor trouble in very modern fashion.

The full-sized engine** designed and built in 1902 by Mr. Manly for the Langley "airdrome" never actually participated in a successful flight, but was so far in advance of its time in design and construction as to be worthy of especial mention. Fig. 2 shows a sectional view of this engine which was a 5-cylinder water-cooled radial of 5 in. bore and 5½ in. stroke. On the test block it developed 52.4 hp. at 950 r.p.m. The

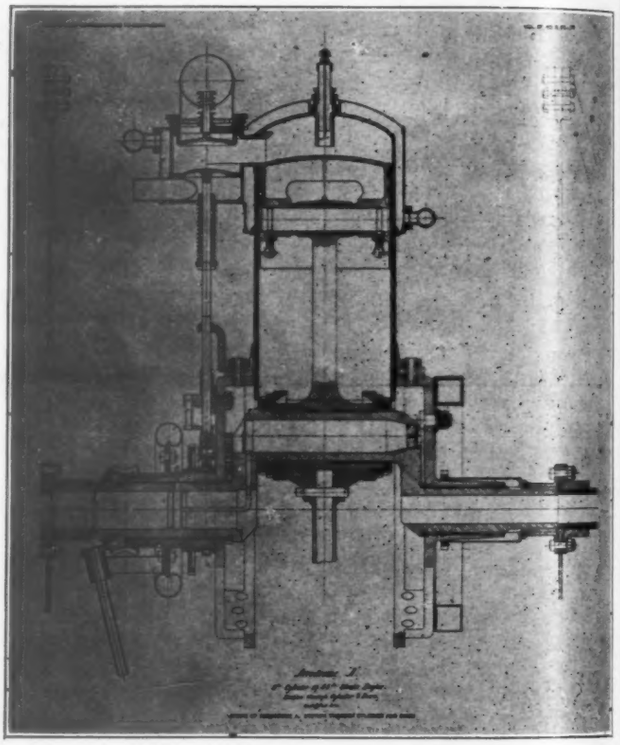


Fig. 2. Diagram of Manly five-cylinder radial built for Langley's full size "Airdrome".

weight, dry, was 125 lb. or 2.4 lb. per hp., while the complete power plant with all accessories, including two light flywheels, radiators and tanks, weighed 187.5 lb. or 3.6 lb. per hp. These weights do not suffer by comparison with corresponding weights of airplane engines of modern type. This engine completed a dynamometer test of 30 hr. at full power in excellent condition. For the year 1902, this was a performance little short of the marvelous, and reflects great credit on the designer. The only really obsolete feature of the engine is the automatic operation of the inlet valves, the exhaust valves being operated by the usual cam and push rod arrangement. The cylinders were made of drawn steel, 1/16 in. thick and were lined with 1/16 in. of cast iron. The pistons were made of steel. The crankshaft was quite conventional in construction. At the time it was built, there was no good source of supply of ignition systems and many parts, such as high tension cable and spark plugs, had to be built with the engine. This engine was completed and tested a short time before the first power flight of the Wright Brothers at Kitty Hawk, December, 1903.

The original specification of the Wright Brothers for an engine for their airplane was that it should develop not less than 8 hp. and weigh not over 800 lb. Only one maker held out any hope of meeting their specifications. He offered a

*From "Langley Memoir on Mechanical Flight" Smithsonian Institution, 1911.

**This engine is on exhibition at the Smithsonian Museum, Washington, D. C.

one cylinder engine weighing 150 lb., but, on investigation, the Wrights decided that it would probably not be able to develop 8 hp., and proceeded to build their own engine. Fig. 3 shows the original Wright engine. It had four cylinders of approximately 4 in. bore and 4 in. stroke, with automatic inlet valves. The fuel was supplied by a pump which sprayed the gasoline into the inlet manifold. Ignition was by a single magneto. Two cylinders were built first and tested on a temporary frame. After thus proving that the engine was capable of developing over 8 hp., the complete engine was built. This would develop steadily 12 hp., although when first started 16 hp. was obtained for a few moments. The engine weighed about 200 lb. or 16.7 lb. per hp. without auxiliaries. While this engine was not nearly as advanced a type as the contemporary Manly engine, it stands as the one with which controlled human flight was first achieved in a heavier-than-air machine, and, as such, becomes one of the landmarks in aeronautical power plants.

While Langley was forced to abandon his work, and the Manly engine was set aside, the Wright Brothers improved their engines rapidly building four-, six-, and eight-cylinder types up to 70 hp., with weights as low as 5 lb. per hp. for engine alone.

The Wrights having shown the way, the development of airplanes and their power plants was soon undertaken by a number of pioneers in both Europe and America. The trend in this country was toward water-cooled vertical and Vee types, while many of the European engines, notably those of Anzani, were air-cooled.

Bleriot's Cross-Channel Engine

Fig. 4 shows the Anzani engine which was the first to cross the English Channel, flown by Bleriot in 1909. The three cylinders, operating on a single crank, delivered 24½ hp. at 1600 r.p.m. and the engine weighed approximately 6 lb. per hp. Another landmark in aeronautical engine achievement was reached when this little engine landed safely on British soil.

The development of the aircraft engine proceeded steadily, if slowly. At the time of the outbreak of the War, there were many different makes and types of engines, but certain types had come to the fore as being especially suitable for aircraft work. Of the 66 engines entered in the German contest of 1913, fourteen were air-cooled, but none of these were among the ten selected for the final trials. There were a number of successful air-cooled engines at this time, however, particularly those of French manufacture. Table II gives the principal statistics of the most representative engines of the period immediately preceding the War.

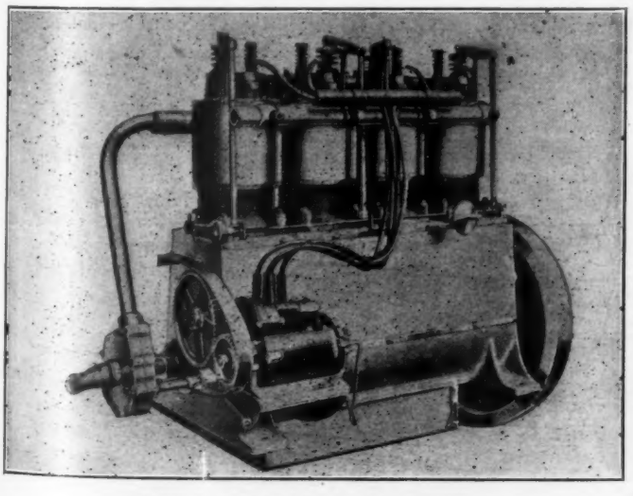


Fig. 3. Wright four-cylinder engine.

The history of the aeronautical engine during and since the War is too well-known to require detailed description. From the situation as outlined in Table I, it will be seen that the War caused a sudden and rapid development, especially in engine size, power, and speed of rotation. The end of the War found the German vertical six's developing as high as 300 hp. with weights as low as 3 lb. per hp. and with remarkably low fuel consumption. Vee type engines were represented by the Lorraine, Renault, Rolls Royce, Liberty, and the Hispano Suiza which was the highest speed engine of that time. These engines weighed from 2 to 3 lb. per hp. The principal types brought out by the War were the water-cooled Vee type engine

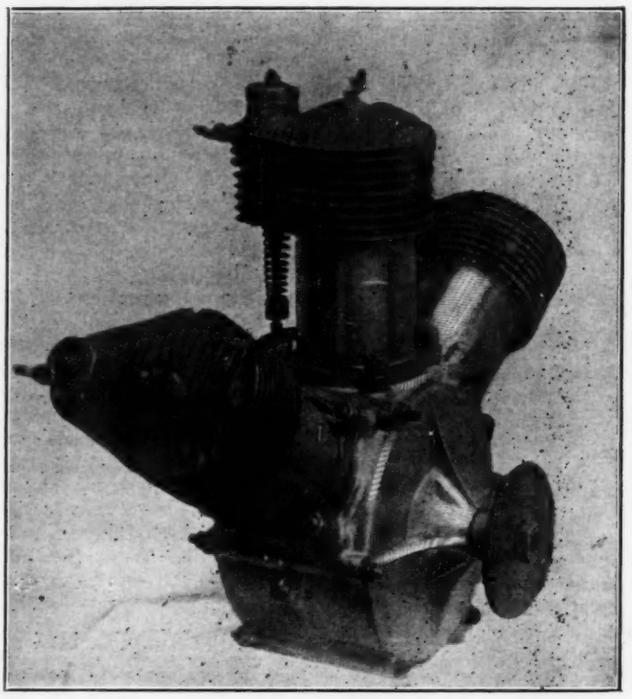


Fig. 4. Anzani engine used by Bleriot in cross-channel flight.

of high speed, best represented by the 220 hp. French Hispano Suiza engine, and the large water-cooled medium speed engines such as the Liberty, Renault, and Rolls Royce. The air-cooled engine, as represented by the "rotaries", had declined in favor and the stationary cylinder air-cooled type had not kept pace with the development of the other types.

The period since the War has been marked chiefly by continued increase in size, power, and speed of the water-cooled Vee type, and by the advent of the radial air-cooled engine in sizes up to 450 hp., this type having come very rapidly into favor during the past two years. The use of the propeller reduction gear has also increased of late, many of the large water-cooled engines incorporating this feature.

Summarizing

In reviewing the progress of the aeronautical power plant, one is immediately impressed with the entire absence of change in the basic features of mechanical arrangement or heat cycle. The piston, connecting rod and crank, and the sequence of events in the cylinder have remained essentially the same since the days of Otto. The supercharger stands out as perhaps the only important development outside of mere mechanical refinement. The exhaust-turbine driven supercharger may be said to have passed the experimental stage in both America and France, and is undoubtedly of the greatest military, if not commercial, significance. Much progress has also been made with mechanically driven centrifugal and positive displacement types, but these have not yet passed the experimental stage.

What have been the controlling factors in the development of aviation engines up to the present time? As already noted, there has been a striking lack of fundamental progress. The remarkable refinement in mechanical detail which has taken place, is due in a large degree to the marvelous advance in materials of construction, especially in the alloys of aluminum and the special alloy steels. There are now available several

alloy steels which retain sufficient ductility for engine parts when heat treated to a tensile strength of 200,000 lb. per sq. in. or more. We have forged duralumin with a tensile strength of 65,000 lb. per sq. in. and even cast aluminum, with proper heat treatment, may be obtained with a tensile strength as high as 35,000 lb. per sq. in. There are several alloys of magnesium now available which develops a tensile strength of 40,000 lb. per sq. in. in the rolled or forged condition. In mentioning materials, we must not forget materials for exhaust valves—alloys of tungsten, chromium and silicon with steel. These have made possible the operation of engines at the high speeds and high power outputs now prevalent, for no satisfactory system of cooling the exhaust valve to a point where ordinary steels can be used has yet been developed. The exhaust valve, in spite of the numerous attempts to reduce its temperature, still runs at red heat in the average high power airplane engine. It is indeed fortunate that materials are available which retain sufficient hardness and strength to function satisfactorily under such conditions.

The Aircraft and Automobile Engine

It has been claimed that the aeronautical engine owes much of its progress to the influence of the automobile. This claim is difficult to substantiate, particularly if one remembers the Manly engine which was so far ahead of anything of its day in the automobile field. While the aircraft industry has taken advantage of some developments for automobiles, particularly in the early days, and the development in materials has been largely fostered by the automobile, the actual design of airplane engines, it appears, has usually been superior to that of the automobile engines of the same period.

Another important factor in aircraft engine development has been the patient and intelligent application of the "cut-and-try" system. Designs are laid down, and checked by calculation, but in the last analysis the development of the engine has depended on long endurance tests. The requirements of extreme light weight has forced the designer to use very low factors of safety, expecting that some failures will occur during the preliminary testing. The cause of such failures as do occur is carefully investigated, the necessary corrections are made and the tests are continued until an engine is obtained which will successfully withstand the conditions of airplane operation. And it appears that further improvement of the aircraft engine will depend largely on intelligent continuation of this "cut-and-try" development, at least until some radical change in heat cycle or mechanical arrangement opens up new fields for originality in design.

TABLE I
Leading Particulars of Early Aeronautical Engines.

Name	Type	Cooling	No. Cyls.	Bore x Stroke in.	Performance at Maximum output r.p.m.	b.hp.	Weight, b.m.e.p. lb./sq. in.	Dry lb./hp.
Manly ¼ size 1902	Radial	Air	5	2 1/16 x 2 3/4	1800	3.2	30.6	3.1
Manly full size 1903	Radial	Water	5	5 x 5.5	950	52.4	80.0	2.4
Wright, first to fly 1903	Vertical	Water	4	4 x 4	...	12.0	...	16.7
Anzani, first to cross channel 1909	Fan	Air	3	4.13 x 5.12	1600	24.5	60.0	5.91

TABLE II.
Some Representative Airplane Engines of the Period Immediately Preceding the European War of 1914.

Name	Type	Cooling	No. Cyls.	Bore x Stroke in.	Performance at Maximum output r.p.m.	b.hp.	Weight, b.m.e.p. lb./sq. in.	Dry lb./hp.
Mercedes E6F (German)	Vertical	Water	6	4.72 x 5.51	1400	100	98	4.5
Curtiss L (American)	Vee	Water	8	4 x 5	1400	80	92	4.8
Sampson A-9 (French)	Radial	Water	9	5.51 x 6.69	1250	230	101	4.2
Gnome B-2 (French)	Rotary	Air	9	4.33 x 5.91	1200	100	84	2.72
Anzani (French)	Radial	Air	10	4.53 x 5.91	1200	125	87	3.7
Renault (French)	Vee	Air	8	4.13 x 5.12	1800	88	70	5.3

New Air Line in Sweden

The Aktb. Aerotransport recently opened experimentally, the air route, Goteborg-Copenhagen-Malmo, which, if results are favorable, will be maintained regularly next year by Aerotransport and probably also by one or two other companies.

The schedule of the new air route is as follows: Leave Goteborg 7 a.m., arrive Copenhagen 8:45 a.m., and Malmo 9:15 a.m. In Copenhagen it will be possible for passengers to continue their journey in planes departing for Berlin, Prague, Vienna, Hamburg, Amsterdam, London, Paris, etc. On the return trip planes leave Malmo at 6:15 p.m., Copenhagen 7:00 p.m., and arrive in Goteborg 8:45 p.m. Travelers who have departed from London, Paris, Vienna, or Berlin in the morning may, thus, arrive in Goteborg on the evening of the same day.

The Supermarine-Napier Flying Boat

Piloted by Capt. H. C. Biard, and carrying its full complement of passengers, the Supermarine-Napier flying boat, the largest British commercial plane constructed, successfully completed its first trials recently and was handed over to the Imperial Airways.

This plane seats 10 passengers, in addition to pilot and navigator, and carries a load of 700 lb. of baggage or mail.

The hull is used entirely for passenger accommodation, the cabin being constructed on the lines of a yacht. The passengers enter from the main deck into the hull by a companion ladder. The pilot and navigator are situated in a specially built cabin on top of the hull. The machine has a wing span of 70 ft., and a height from the sea of approximately 24 ft. The cruising speed is 90 m.p.h., with a maximum of 108 m.p.h. It is fitted with two 450 hp. Napier Lion engines, of the same type as that which powered the four R.A.F. planes which recently completed the 14,000 mile flight, Cairo-Cape Town-Cairo-England.

The Supermarine Swan (twin Napier Lions, 450 hp. each) ten passenger commercial seaplane from which the Southampton, the R.A.F. service seaplane was developed

REMEMBER — NATIONAL AIR RACES, SEPT. 4-11

The Start of the Airplane Reliability Tour

Twenty-Five Commercial Planes Start on Second Annual Tour for the Ford Trophy.

THE START of the Commercial Airplane Reliability Tour for the Edsel B. Ford Trophy from Ford Airport, Dearborn, Mich., on Saturday, marked the first of the three great national flying events of the year, the other two being the National Air Races, to be held this year in Philadelphia on Sept. 4-11 and the international seaplane race for the Schneider Cup which is to be held at Hampton Roads. Twenty-five machines actually started on the Tour although those originally entered considerably exceeded this number. Among those which started is included the Driggs Dart, the small light-plane with the Wright Morehouse engine, which, equipped with a Henderson engine was first seen at the Dayton Air Races in 1924. This machine is not actually competing in the Tour for the Ford Trophy but for the prize of $1000 put up by William B. Stout.

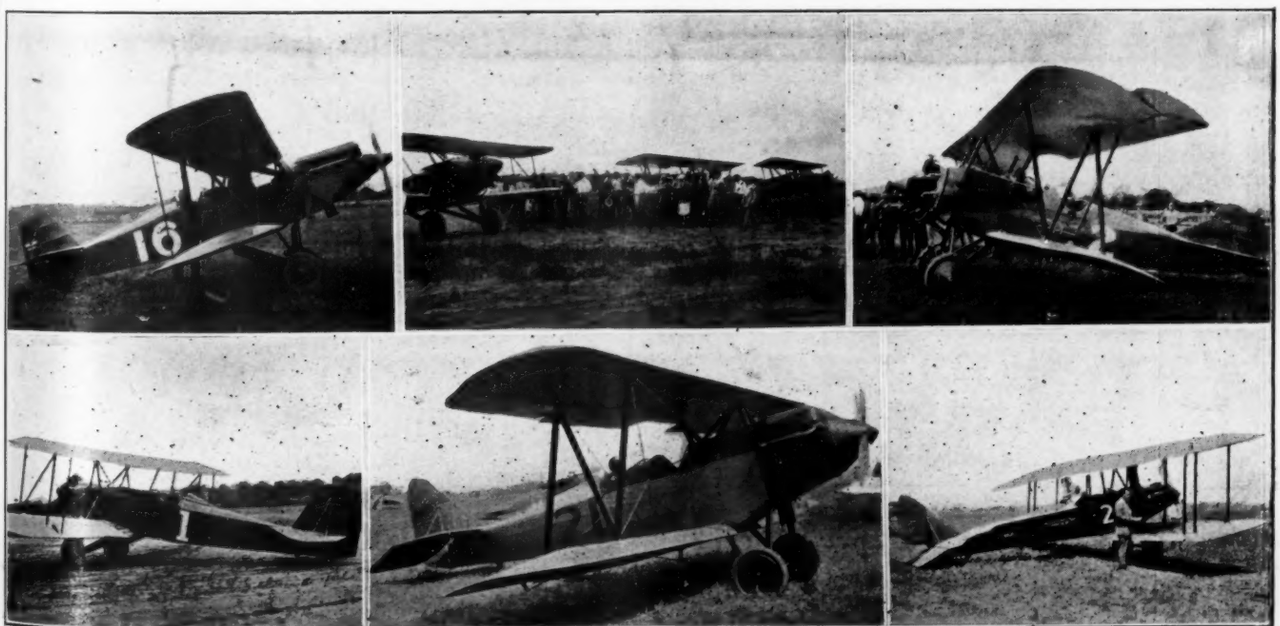
The Non-Starters

Machines began to collect at the Ford Airport early in the week and by Friday morning twenty-four of the machines were already at the field, those missing being the Hess Bluebird, entered by the Hess Aircraft Company of Wyandotte, Mich., the Sperry Messenger entered by the Houston Aerial Transport Co., Houston, Tex., the Superior, entered by the Superior Aircraft Co., Detroit, Mich., and the Cole plane entered by the Cole Airplane Co. Cleveland, Ohio. However, all but the Hess Bluebird failed to arrive during the day and consequently it will be impossible at this time to give any indication as to the exact nature of these other planes as they are of types which have not so far appeared in public to any great extent. The Sperry Messenger, which was to be entered by the Houston Aerial Transport Co., is, of course, a well-known type.

What might be termed the first official activity connected directly with the Tour was the smoker given for pilots and all others concerned in the Tour on Thursday evening, Aug. 5, at the Statler Hotel, which was pilots' headquarters. This very propitious arrangement enabled a much needed "get together" of all the pilots and the organizers and various contest officials of the Tour. H. G. McCarroll, Tour Manager, and Herbert V. Thaden, chairman of the contest committee, were masters of ceremonies and during the evening all matters and queries concerning the arrangements for both the preliminary tests of Friday and the actual start of Saturday were carefully gone into and cleared up. Lots were also drawn for position in the start, this being considered a wise plan because of the number of changes in entries which had been made. Incidentally, in spite of this, it became necessary just before the actual start on Saturday morning slightly to rearrange the starting order again. The meeting, incidentally, closed with Walter Beech, general manager of the Travel Air Manufacturing Co. of Wichita, Kan., representing the municipality of Wichita, expressly inviting the tourists to make themselves thoroughly 'at home' when they arrive at this city. Wichita is certainly becoming a center of aviation, along with the various other "centers" such as that of Detroit itself, and has reason to be proud of the fact that two of the Industry's finest commercial airplanes, the Travel Air and the Super Swallow are manufactured there.

Formula for Points

The following day, Friday, was perhaps more interesting than the actual start of the Tour itself, for on this day not only was everyone at the Ford Airport, including all the Modocks, but the airplanes went through their landing and take-off tests. The idea of these tests was to form a basis upon which the points gained by the planes in the Tour might be worked out. The primary object of the Reliability Tour, as is well-known, is to encourage the economy, reliability and serviceability of airplanes suitable for commercial and private flying. It is an easy matter to arrange a good speed race for airplanes but, when other factors are to be em-



Staff Photos

Snaps at Ford Airport at the start of the Commercial Airplane Reliability Tour. Top row, left to right. The Hess Bluebird (Curtiss OX-5) entered by the Hess Aircraft Co.; the Verville Airster starting on the Tour at the drop of the flag; the Pioneer Instrument Company's Travel Air Showcase. Bottom row, left to right. The Buhl-Verville Airster (Whirlwind); the Super Swallow (Curtiss OX-5); the Pitcairn Orowing (Curtiss OX-5).

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phasized, the choosing of a formula from which to determine points scored by the entrants is extremely difficult if any degree of impartiality among the various types of airplanes is to be obtained. The formula selected for this year's Tour is as follows:

$$\frac{\text{Contest load} \times \text{Speed (m.p.h.)}}{\text{Stick Time} + \text{Unstick Time}} \times \frac{50}{\text{Eng. Disp.}} = \text{Points}$$

Where:

Stick Time means the time in seconds between wheels touching and plane coming to rest in landing and the contrary in taking off for Unstick Time.

It was the stick and unstick trials which were carried out on Friday, after which no further entries could be considered. The Hess Bluebird, which, when it was seen the day before in the manufacturing shop of the Hess Aircraft Co., was not even rigged up, arrived a little after 6:00 p.m. and just got its stick and unstick tests done in time. It would have been a great shame if this little machine had been scratched for it is one of the new commercial three-place planes of the past year and is certainly one of the finest looking planes in the Tour, resembling a small pursuit plane more than anything else, although the place where the "D-12" goes is filled with an OX-5 engine. Incidentally, there is likely to be a

Staff Photos

Snaps at Ford Airport at the start of the Commercial Airplane Reliability Tour. 1, M. J. McInaney, of the Alexander Aircraft Corp. of Denver, Col. 2, the clipped wing Curtiss Oriole (Curtiss C-6) flown by Casey Jones. 3, H. C. Mummert, chief engineer of the Aerial Service Corp. of Hammondsport, N.Y. and pilot of the Mercury Arrow. 4, Casey Jones who is flying the clipped wing Oriole, of the Curtiss Flying Service. 5, the Ryan M-1 monoplane, (Whirlwind) of the Ryan Airlines, San Diego, Cal. 6, the Fairchild monoplane (Curtiss OX-5). 7, one of the Alexander Eaglerocks (Curtiss OX-5), entered by Niles Air ways and piloted by W. E. Kysor. 8, Alfred Verville, designer of the Buhl-Verville Airster. 9, the Woodson Express, entered by the Woodson Engineering Co.

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number of these Hess planes around the country shortly. The Hess Aircraft Co. has not been in existence very long but a few minutes spent in its manufacturing shops at Wyandotte, Mich., is enough to satisfy one that the Bluebird is the embodyment of the best materials put together in the best workmanship manner to produce a first class airplane. Aubrey Hess, the president of the Company, is to be congratulated on the design of the plane. It is hoped that shortly it will be possible for AVIATION to describe this machine in detail but for the moment it is sufficient to say that it has a welded steel tube fuselage and wood construction wings of Clark Y section, and a split-axle undercarriage. Passenger entrance to the forward cockpit is by means of a door.

Stick and Unstick Tests

To return to the Tour itself, the landing and take-off tests started as soon as the machines were loaded up satisfactorily. It will be recalled that the contest load for the Tour consists of 0.5 lb. per cu. in. of engine displacement and that for every 25 lb. carried there must be one cubic foot of cabin, cockpit or other cargo space,—if not, the load must be reduced accordingly. This weighing-in having been concluded, the timers and checkers, multitudinous in number, but recruited mostly from the 107th. Observation Squadron, Michigan National Guard under the command of Major Floyd S. Evans, and the Detroit Flying Club, obtained the following details for the entrants regarding stick and unstick times in seconds. (This comprises the complete entry list of the Tour with the planes' respective numbers and pilots and pasengers.):

No. 1—Buhl Verville Airster; pilot, Louis G. Meister; no passenger. Unstick (take off) 12.6 seconds; stick (landing roll) 8.4 seconds.

No. 2—Travel Air; pilot, Walter Beach; passengers, Brice, Goldsborough and Richard Blythe. Unstick, 8.4; stick, 8.

No. 3—Travel Air; pilot, C. E. Clark; passenger, Edward White. Unstick, 9.4; stick, 7.8.

No. 4—Out.

No. 5—Eaglerock; pilot, R. B. Rolands. Unstick, 14.4; stick, 8.4.

No. 6—Eaglerock; pilot, J. R. Williams. Unstick, 11; stick, 10.2.

No. 7—Ford; pilot, R. W. Schroeder; passengers, Kenneth Boedecker, Harold Wymer, Frank Bogart, Charles E. Planck and Earnest Greenwood of the Dept. of Commerce. Unstick, 12; stick, 6.8.

No. 8—Ford; pilot, Leroy Manning; no passengers. Unstick, 19.6; stick, 17.8.

No. 9—Cole; out.

No. 10—Curtiss; pilot, Casey Jones. Unstick, 16.5; stick, 10.

No. 11—Mercury Arrow; pilot, Harvey H. Mummert; passenger, J. F. Meade. Unstick, 18.6; stick, 8.

No. 12—Fairchild; pilot, Richard H. Depew, Jr.; passenger, R. M. Johnson. Unstick, 20.6; stick, 11.4.

No. 13—Woodson; pilot, Russell Hossler; passengers, B. V. Hughes and Ray Sturtevant. Unstick, 10.8; stick, 12.

No. 14—Woodson; pilot, Phillip H. Doones; passengers, Frank Dorbandt and Don Stambaugh. Unstick, 12.4; stick, 10.

No. 15—Woodson; pilot, H. H. Gallup; passenger, Harry Taylor. Unstick, 13.04; stick, 13.6.

No. 16—Hess; pilot, William Munn. Unstick, 16.2; stick, 14.

No. 17—Waco; pilot, J. W. Livingston; passenger, Ross Smith. Unstick, 8.4; stick, 11.

No. 18—Waco; pilot, E. G. Knapp; passenger, L. A. Kitchen. Unstick, 12.6; stick, 12.

No. 19—Pitcairn; pilot, J. G. Ray; passenger, A. Halstead, of the Dept. of Commerce. Unstick, 12; stick, 11.4.

No. 20—Pitcairn; pilot, Harold F. Pitcairn; passenger, Agnew E. Larsen. Unstick, 11; stick, 10.

No. 21—Swallow; pilot, C. M. Sterling; passenger, O. H. Hickman. Unstick, 14; stick, 8.8.

No. 22—Teal; pilot, A. F. Everett. Unstick, 10.6; stick, 15.

No. 23—Ryan; pilot, Vance Breese. Unstick, 11.2; stick, 14.

No. 24—Driggs; pilot, Jack Laass. Unstick, 16; stick, 14.

No. 25—Travel Air; pilot, C. S. Irvine; passenger, Sgt. Charles Laffler. Unstick, 20.8; stick, 10.

No. 26—Waco; pilot, J. P. Riddle; passenger, Mrs. Susan H. Embry. Unstick, 6.8; stick, 11.

No. 27—Stinson; pilot, Eddie Stinson; passengers, W. A. Mara, John and Edward Schlee. Unstick, 14; stick, 7.

The only woman on the Tour is Mrs. Susan H. Embry, passenger with John Paul Riddle, of Cincinnati, in the Waco, No. 26 entry. Mrs. Embry is a student of flying herself, and by the time the Tour is finished, expects to have sufficient time in the air to "solo" when she gets home. After that, the plane on which she made the Tour, will be her own.

The times given in the foregoing table are of more than passing interest for it must be realized that, according to the

Courtesy Detroit Times

The Ford 'Air Flivver' which attracted so much attention at the start of the Tour. The engine is an Anzani, 35 hp.

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formula, the addition of these times in each case is to be a dividing factor in obtaining the number of points scored at the end of the Tour. Thus, should a plane have an exceptionally high figure in these tests, then this is likely to be somewhat of a handicap throughout the Tour. The stick and unstick tests were carried out by the machines one at a time, several, however, being in the air at once. Only one test per plane was permitted and it would seem that on future occasions it would be wise to have either the best of three stick and unstick tests or an average of three for it is very poor luck upon a pilot if he happens, for some reason or other, to have executed a poor landing or a slow take off during the tests, thus unnecessarily handicapping himself throughout the Tour.

Throughout Friday, a considerable crowd collected at the Airport to view the planes and it was expected that, since the start of the Tour was scheduled for 9:00 a.m. on Saturday, comparatively few spectators would gather. This proved entirely incorrect for there were, to make a rough estimate, at least 30,000 people at the Ford Airport by 9:00 a.m. on Saturday. The weather which had been changeable and overcast, with storms during the previous two days, appeared at first to be clearing but, as was expected after an inspection of a weather map, did not continue to clear and finally, as the last of the planes was going off, it was even trying to rain, which, however, it did not actually do. There was some delay in getting the planes away,—some of those inevitable delays which arise when a number of airplanes are to be despatched together on time.

The Start

The first machine to go, the Buhl-Verville Airster equipped with a Wright Whirlwind engine, and piloted by Capt. Louis G. Meister, left at approximately 9:45 a. m. and the other planes followed at intervals of one minute. The direction of the wind was considerably more favorable than last year from the standpoint of the bulk of the spectators who were kept back in definite enclosures, for, instead of the planes having to take off away from the hangars as they did last year, it was possible for them to go away right in front of the hangars, starting from a point where they all gathered in rows some distance over toward the airship mooring tower. The start itself was uneventful. There was no delay; no planes were late on the line as was the case in one or two instances last year and everything went off to order. Capt. Eddie V. Rickenbacker was the starter.

Earlier in the morning, three Curtiss P-1 pursuit planes, a Curtiss O-1 observation plane and a Douglas Transport arrived. The pursuit machines immediately began to put up one of the nicest displays of formation flying at high speed that has been seen. They landed after a while, but all cleared off again, after another brief display of pretty flying, to catch up the Tour planes on their way to Kalamazoo.

Planes Mark Progress of Year

There was a marked contrast between the machines entered in the Tour this year and those which went around the Middle West in the first Tour, last year. With but one or two exceptions, all the machines are new products of the past twelve months and they presented a very forceful indication of the progress which has been made in commercial airplane design and construction during the past twelve months. One of the most noticeable points regarding the planes as a whole was the number of machines which were fitted with air-cooled engines, with three exceptions, the products of the Wright Aeronautical Corp. The exceptions are the three Woodson planes which are equipped with Salmson 220 hp. nine-cylinder air-cooled engines. There are ten air-cooled engine planes in the Tour, namely, the Buhl-Verville Airster, No. 1, Whirlwind; the Travel Air No. 2, Whirlwind; Ford-Stout three-engined Transport, No. 7, three Whirlwinds; the two Woodson Sport and one Woodson Express plane, Nos. 13, 14, and 15, with Salmson engines (French); Ryan M-1 monoplane, No. 23, Whirlwind; Driggs Dart, No. 24, Wright Morehouse; and the Stinson Detroiter, No. 27, Whirlwind. With the exception of the Salmson engines, all these engines are manufactured by the Wright Company. It was unfortunate that the Cole entry was not forthcoming for this machine was to be fitted with the new Rickenbacker engine and its performance would have been watched with much interest.

A second striking technical feature concerning the planes in the Tour is the number which are equipped with undercarriage wheel brakes. Five or six of the machines going on the Tour are so fitted and this is perhaps one of the most important developments which the Tour has brought out, it being caused, presumably, almost entirely by the stick and unstick requirements. But this is just one of the examples of the excellence of this type of contest for airplanes, for in no speed race or handicap race for airplanes could the qualities of reliability, economy, carrying capacity and serviceability for commercial and private purposes be brought out so well. The wheel brakes are undoubtedly a very important addition to the privately owned airplane. The most surprising thing, however, about these brakes is that it is apparently impossible to notice directly their effect upon the

Courtesy Detroit Times

Henry Ford inspecting the new Ford 35 hp. 'flivver' plane

landing test results of the planes so fitted. One would have expected that it might almost be possible to pick out those machines which were equipped with wheel brakes, just by reviewing the landing time figures. It can only be assumed that with the slight experience which has so far been obtained with this new development, pilots were not able to make the most use of the advantages possible with the wheel brakes.

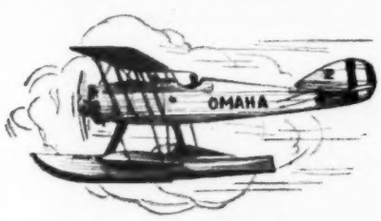
It is perfectly obvious that there must be an optimum point at which the wheel brake becomes most effective in landing. When a machine first comes to the ground most of the weight is supported by the wings and, consequently, the wheel brakes must be applied only very slightly. This is assuming that the maximum braking force is obtained when the wheels are just permitted to turn and not when they are completely locked. Now, as the weight of the airplane is transferred from the wings to the undercarriage, the braking force must be increased accordingly, otherwise its effect will remain almost nil. If, on the other hand, it is applied in excess, then the wheels will lock and the machine will tend to stand on its propeller on the ground. So, it will be seen that the use of wheel brakes in airplanes is far more than the mere fitting of these to the machine and some experience will be necessary before their maximum advantage can be gained.

Why the U. S. Navy Uses Valspar

Often, when varnishes other than Valspar have been supplied to the fleet, the men have dug down into their own pockets to buy the "famous varnish that won't turn white." Why? Because they know that Valspar keeps their craft ship-shape much longer than other varnishes.

NAVY regulations prevent the mention in specifications of any particular brand of varnish to be used aboard ship. Yet an analysis of the requisitions of the Battle Fleet for all aircraft and auxiliary boats after the termination of the 1926 manoeuvers brings to light the amazing fact that Valspar was requested in every case.

Why? Because the officers and men would have no other. Past experience had proved to their entire satisfaction that there is only one Valspar, that Valsparred craft come through trying ordeals and severe service far better than those finished with other "spar" varnishes.



Navy Aircraft are Valsparred.

The Admiral's Barge and the Captain's Gig are kept shining with Valspar.

This fact was thoroughly demonstrated in the 1924 manoeuvers, when Naval Air Squadrons were exposed to unusually severe conditions. The planes that were Valsparred came through with flying colors. The others suffered by comparison.

Naturally the Navy's use of Valspar has steadily increased, until with the operations held recently in southern waters, Valspar was supplied to all craft, with only a few exceptions where stocks of other varnish were on hand which fleet economy would not permit to be wasted.

So the Navy uses Valspar—and "swears" by it. For men and officers alike know that Valspar reduces the work of keeping their craft trim and ship-shape, preserves their record for smartness.

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One of the most interesting planes in the Tour is the Travel Air No. 2, in which, incidentally, C. G. Peterson, of the Wright Aeronautical Corp. flew as far as Kalamazoo, together with Richard Blythe, who is continuing around the Tour in this machine, piloted by Walter Beech of the Travel Air Manufacturing Co., Wichita, Kan. The machine, known as the Pioneer Showcase, is one of the most beautifully equipped machines one has ever seen. It is similar to a standard Travel Air but has a somewhat wider fuselage, which accommodates two in the pilot's cockpit as well as in the passenger's cockpit. The plane is fitted out as a complete traveling exhibition of all those excellent instruments which are made by the Pioneer Instrument Co. of Brooklyn, N. Y. The instrument board in the rear cockpit carries the new Pioneer vertical instruments which not only take up so much less room than the standard type but are so much more orderly and easy to read. The plane is equipped with the Pioneer Earth Inductor compass which has spelt success to so many long distance flights during recent years. It also has navigating lights on the fuselage and wing-tips, beautifully arranged in tiny streamlined transparent casings. The Pioneer Company should find that many people throughout the Tour are attracted to this flying exhibition of the last word in airplane instruments.

The Buhl-Verville Airster, finished as it is in the Duo-Color process used extensively on automobiles, presented a very pretty picture, with its brilliant scarlet fuselage which reflects almost like a mirror. The machine had the forward cockpit covered in. It has the most beautiful lines that an airplane could have and is a reminder of the clean lines of Mr. Verville's racing planes which set up speed records a few years ago.

Another very interesting plane is the Eaglerock, two of which are in the Tour, one owned by Niles Airways. The Eaglerock is another very nice looking plane designed around a Curtiss OX-5 engine. Of course, at the Ford Airport it should have been one of the very best fliers, since it is a machine which is constructed at an altitude of 6000 ft. and has all its flight tests carried out at this height. The plane, as is well-known, is produced by the Alexander Aircraft Co. of Denver, Col.

The Only Three-Engine Plane

Perhaps the plane which attracted the most interest in the Tour was the new Ford-Stout three-engine plane equipped with three Wright Whirlwind engines. In appearance this plane is very similar to the standard Ford all-metal plane and many believe it to be an absolute copy of this machine on a slightly larger scale. The new machine is, however, entirely of new design but every endeavor has been made to produce a plane which resembles as closely as possible the single-engine Stout machine. The engines are rigged under the wing in a manner very similar to that adopted in the three-engine Fokker plane and the undercarriage too is of very similar type. This machine, being the only three-engine plane, is not competing for the Ford Trophy.

The only real old-timer in the Tour is the Curtiss clipped wing Oriole with wing radiators and piloted by Casey Jones. This machine will be remembered by all who have attended the last two National Air Race meets. It usually pulls a winner in one or other of the National Air Race events but how it will show up in a Commercial Reliability Tour will be interesting.

The Mercury Arrow, of the Aerial Services Corp, Hammondsport, N. Y., is, in fact, the Mercury Jr. feeder-line mail carrier designed by H. C. Mummert, who is piloting the machine in the Tour, with J. F. Meade, of the same company, as passenger. Three Woodson planes of the Sport and Express types, fitted with Salmson engines are in the Tour. These engines together with the excellent design of the Woodson machines, give them a remarkably good performance. The take-off is exceptionally short and the climb very rapid.

A very recent development is the Fairchild monoplane a three-passenger closed cabin machine built around the OX-5 engine. The machine is a high wing monoplane with bracing struts from the bottom longeron, and the wings fold back for storage as do those of the Buhl-Verville Airster. The most interesting features regarding the plane are the wing flaps which extend along the entire trailing edge and serve the purpose of ailerons as well as flaps for reducing the take-off and landing run. Mechanism is provided whereby the change in the center of pressure caused by a movement of the flaps is automatically compensated for by a movement in the stabilizer setting.

There are three Waco machines in the Tour and all these will undoubtedly perform well unless something very unforseen happens. Nos. 19 and 20 are the two Pitcairn planes,—one, the Fleetwing and the other a new development of Pitcairn Aviation Inc. It is a three-place OX-5 engine plane, the wings and tails of which are Curtiss Orioles with a fuselage, which has been designed by Agnew E. Larsen, designer for the firm, and who was a passenger in the machine which is piloted by Harold F. Pitcairn. The machine is called Orowing.

Entry No. 22, the Teal, is a plane produced by the Babcock Airplane Co. and equipped with a Curtiss C-6 engine. It has Martin 2 wings, with a fuselage and undercarriage which resemble very closely those of a Standard.

Of the other entries, the Swallow is well-known as one of the commercial planes which have *made* aerial service in this country. The Super Swallow is the latest development of the Swallow Airplane Co. of Witchita, Kan., and is a really beautifully constructed and finished plane. And, finally, No. 27, is the Stinson Detroiter, the four-seater cabin machine which has already done a good deal of flying. The machine is equipped with the Whirlwind engine and incidentally, before the Tour started, was sold to the Wayco Oil Co. of Detroit.

Perhaps the star turn of the start of the Reliability Tour, although it had absolutely nothing to do with the Tour itself, was the appearance of Mr. Ford's latest airplane product, the little 'flivver' plane which has been mentioned in almost every daily newspaper in the country, lately. Little has been said about the plane as it is a very hush-hush product and few knew of its being built until it actually appeared. The machine, which was designed by Otto Koppen, formerly of the Massachusetts Institute of Technology, is a very small low wing monoplane with a wide undercarriage and an Anzani 35 hp. engine. It carries just its pilot, at the moment Harry Brooks being the only one who has flown the machine. He flies it as a pursuit pilot flies his plane. The machine has a very quick take-off, Brooks as a rule just running straight out of the private garage in which Mr. Ford keeps the machine, into the air. It has no tail skid but in its place a small wheel built into the rudder with which the plane is steered on the ground. There is a small tire brake on this wheel.

Tour Schedule

The route and schedule of the Airplane Reliability Tour is as follows, together with the distance and times of arrival and departure:

		Leave	*Arrive*	*Miles*
			a. m.	
Aug. 7	Detroit to Kalamazoo (Municipal Airport)	9:00 a. m.	10:30	120
			p. m.	
Aug. 7	Kalamazoo via Hammond, Ind. to Chicago (Maywood Flying Field)	2:00 p. m.	3:30	130
Aug. 8	Chicago to Milwaukee (Hamilton Airport)	1:30 p. m.	2:30	60
Aug. 9	Milwaukee to St. Paul (Municipal Airport)	10:00 a. m.	1:00	300
Aug. 10	St. Paul			
Aug. 11	St. Paul to Des Moines (Special Field for Tour)	10:00 a. m.	12:30	240
Aug. 12	Des Moines to Lincoln (Lincoln Standard Airport)	10:00 a. m.	12:30	165
Aug. 13	Lincoln to Wichita (Municipal Airport)	10:00 a. m.	12:30	220
Aug. 14	Wichita to Kansas City (Richards Field)	10:00 a. m.	12:30	170
Aug. 15	Kansas City			
Aug. 16	Kansas City to Moline (Campbell Airport)	10:00 a. m.	12:30	280
Aug. 17	Moline to Indianapolis (Indianapolis Speedway)	10:00 a. m.	12:30	250
Aug. 18	Indianapolis to Cincinnati (Lunken Airport)	10:00 a. m.	12:30	100
Aug. 19	Cincinnati to Cleveland (Municipal Airport)	10:00 a. m.	12:30	200
Aug. 20	Cleveland to Fort Wayne (Municipal Airport)	10:00 a. m.	12:30	180
Aug. 21	Fort Wayne to Detroit (Ford Airport)	3:00 p. m.	6:30	140

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CONSOLIDATED AIRCRAFT CORPORATION

Buffalo, New York

"Daring Young Men Needed . . ."

By SWANEE TAYLOR

'ERE THIS edition of America's great aeronautical paper reaches the reading public, real commercial aviation will have been thoroughly launched, and lunched, within our native shores. I use the term real, advisedly. The nativity of the little commercial newcomer will be heralded by lusty clashing of cymbals and loud wailing of reeds, together with columns of newspaper space and miles of newsreel footage. And out of the large cubic foot volume of speeches, each accompanied by a veritable cannonade of cork blupping, one seed of thought, and only one, will be sowed to take root in fertile minds: The growing need of pilots. And this need in itself, bids fair to become chronic within the next several years.

A Dearth of Fliers in Sight

The present crop of capable fliers, (none too sturdy ever), is fast dwindling. Crashes still claim a few, and the others are groping about in quest of a line of endeavor where human values are not so niggardly held. Isn't Casey Jones doing right smart in the wholesale metal propeller business, thank you? Captain Amundsen has had enough. He has returned to Norway to spend his remaining days ski-jumping from fjord to fjord, and back to precipice again. Al Williams has married and, according to rumor, soon will be zooming the bar of justice. Cy Caldwell has taken out poetic license to take his stand in the ranks of serious literature alongside Babe Ruth and the MM Jack Dempsey and Jack Kearns, only I hear that Cy is going to write his own stuff. Also, it is a pretty good guess that Dick Byrd just about concluded a most noteworthy active flying career when he looped the North Pole. Yes, fresh meat is needed, and they are beginning to bawl, "Daring young men needed . . ."

Those of us who have started to fret a bit over the mounting timber line on our brows will read the newspaper blather with a broad understanding, and with the mental reservations that come with some nine or ten years close association. Some of us may even sit through a festive luncheon or two, trying valiantly to appear engrossed in the Hon. George D. Chopsticks' remarks, wondering the while just who in hell is hanging onto that bottle so long. Absolutely, these alarms will pass us by as the idle breeze, for you can't fool the horseflies always. But the youth of the nation, the stuff that volunteer armies are made of, will pounce upon, and digest in utter seriousness Senator Ketchup's husky call for daring and patriotic young men to embrace this new profession of the skies. And the dear Senator is not without his dulcet moments. He will wave the flag and urge young men to enter aviation both as a patriotic gesture, and as a means of putting hot groceries to the body regularly.

It has already been stated, in the public prints, that almost any daring and dashing automobile driver can become an expert aviator with a mere few weeks' intensive training. Such poils of wisdom drip hot from the pens of one great editorial virtuoso who siteth at the right hand of Mr. Hearst, and from Hugh Fullerton, who is a great help in giving us "Liberty" once a week. Such authority is ever regarded as a trifle more than omnipotent by immature minds. Then, when the good Senator Ketchup strikes a patriotic chord in their bosoms, many young men will spring to action, gird the loins and make a concerted move on the various flying schools; both civilian and military. All of which will be highly satisfactory to, and strictly in keeping with, the well-laid plans of the directors of various airlines. In this rush to the flying schools they foresee a bumper crop of pilots, which, in turn, will mean low wages in keeping with the ancient supply-and-demand ratio. These visionary Princes of Commerce will be highly pleased with themselves for having slipped over such a neat bit of subtle propoganda. They smack the chops, rub the hands and gloat accordingly.

But here is the laugh: Whereas youngsters do make good fast military pilots, (Imperial German Air Service, please write), they are pretty much foul balls in commercial aviation, (U. S. Air Mail Service, please don't write,—telegraph). And whereas irresponsibility and disregard of eventualities are desirable traits in battle (necessary, in fact, to insure victory), they are decidedly what the boys call 'bad news' where there is no enemy to confound and where the only victory to be earned is arriving at a given point as soon as possible without causing damage, either, property or dermal. Promoters of these new air lines are blithely ignorant of these pertinent facts, *hence,* in their dull fashion, *they* have relegated the art of flying into the classification of chauffeurdom—below the rank of street car motormen. Then, with equal blandness, they overlook the fact that a deep responsibility is placed when valuable cargo, including human life, is entrusted in one man's keeping in the air. It is a responsibility which becomes both hallowed in quality and quantity, and which calls for men of the very highest judgment. It causes me pain to say it, but graduates just out of flying schools unfortunately do not possess the good judgment that goes with wearing responsibility gracefully. It is written in The Book that Responsibility is begat of Judgment, who in turn *was* begat *of* the old boy Experience himself. Anyone, with the slightest conception of airways flying knows that day-in and day-out cross-country flying calls for more than just a nodding acquaintance with M. L'Experience, or Kid Time-in-the-Air as his friends know him. A man with less than 300 hr. cross-country time should never be considered as pilot of an airline plane. This, however, is a fact the dear directors and their Kiwi general managers will have to learn from bitter and costly experience. And golly, won't they moan when the year's profits are knocked cool and kicking by one snappy crack-up. A second smash will put them deep in the hole. Which, without a doubt, will start a thought fermentation in their collective brain. There is nothing in the world that hurts a director as much as pains in the coffers. The very first steps taken to drive off this ache is always to purge the system of a general manager or two. This remedy generally leaves father and child doing nicely.

The Great Test

But the Youth of the Nation—the sucker list,—poor fellows, they, too, will wear a crown of thorns. They will emerge from Main Gates of their aeronautical Alma Mamys, with diplomas suitably framed, all eager to up and at 'em. The discouraging tones of other pilots out of a job will not deter these snappy eyed youths. They will bust in on all local operations offices ready to slip on the helmet and goggles, and write letters to distant headquarters. But by this time there will have been a regular parade of general managers in and out of the sanctum-sanctorium. Not until the heartbreaking rounds have been made several times will the dawn of truth crash upon them. Many won't survive this, the first of a long series of galling disappointments and disillusions. Most of the fledglings will fold up the wings and become ground grippers. The rest, the dogged devoted lot will cast about for a backer, get a plane and blaze forth as one of the hated and hounded gypsy flier breed. In several years, if they survive the severe apprenticeship, they will reach the goal, being competent and capable of flying anything, anywhere and at any time. Then, and only then, will they be fit for the responsibility and skill that is requisite for air line pilots. Yes, indeed, daring young men certainly are needed. They gotta be daring,—but with reverse English.

A Correction

In the Aug. 2 issue of AVIATION appeared a page advertisement of the Gibbons Co. regarding their landing and launching device for airplanes which is adaptable to roofs of buildings and decks of merchant and naval vessels. The copy for this advertisement stated that "two battleships which a foreign government is now building will be constructed to be their own carriers, which means to regulate the aeroplane carriers to floating repair, machine shops and storage." In the advertisement as published, the word "carriers following "to regulate the aeroplane" was omitted from the sentence quoted.

FOKKER
AIRCRAFT

were not entered in the second annual **FORD RELIABILITY TOUR** because — public demand for these safe, reliable "*TRIMOTOR*" and "*UNIVERSAL*" planes has for the present exceeded production.

The most convincing demonstration of the superior reliability of *FOKKER* Aircraft is their commercial operating record. They are flying more than 10,000 miles per day, on regular schedule.

FOKKER "*TRIMOTOR*" ten passenger planes are flying twice daily from Philadelphia to Washington and return with passengers and U. S. Air Mail — **FOKKER** "*UNIVERSAL*" 5-passenger planes are carrying U. S. Mail daily between New York and Boston.

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Side Slips

By ROBERT R. OSBORN

At the time of this writing, the Sikorsky trans-Atlantic plane is getting the finishing touches and promises to give us something to talk about when the test flights can be made. The police guard always at the door of the hangar makes it look as if the souvenir hunters have been around already for wings, rudders, landing gears and other odd bits to add to their collections. All human beings seem to be afflicted to some degree with this desire to steal all sorts of junk which soon proves to be worthless to everyone but the luckless person from whom it was stolen, and we suppose the safest course is to keep everyone clear of the machine in this case.

We have heard that there was quite a bit of trouble in this way when the NC boats were built for the first trans-Atlantic flight and that instruments and lots of other parts easily removable were stolen repeatedly both before and after the flight. Airplane clocks seem to be particularly desirable and we suppose there must be a dozen clocks hidden away which "positively crossed the Atlantic in the NC-4". In the years to come there will probably be as many of these clocks on exhibit as the "grandfather" clocks we have today which unquestionably came over in the Mayflower.

• • •

A few years ago a Frenchman visited this country with a lightplane and got quite a bit of newspaper publicity for his plans to tour the whole country demonstrating it. After a few days playing around with it he was unfortunate enough to land in a tree on a New Jersey golf course. He climbed down out of the tree and walked off to a nearby village to get someone to disentangle his plane for him. If he had had any knowledge of the American souvenir hunter at his worst he would have camped under that tree with a sawed-off shotgun, for when he returned there was not much left except a few spars and struts. Carburetor, magneto, propeller, cylinders and sundry other miscellaneous items had apparently fallen out of the tree like plums into the hands of the crowd underneath, and, as far as we know, the only satisfaction the poor chap got out of it was to express his opinion of Americans in general, in terms which they could not even appreciate.

• • •

Our friend, The Intrepid Pilot, was in to see us again this week and is quite concerned about the news that Captain Fonck's Sikorsky plane has been finished inside the cabin, by an interior decorator, with mahogany and Spanish brown leather,—red, gold and silver being the main color scheme. He said he would not mind if it goes no further than this, but is worried that these colors will be just a stepping stone to some of the new colors being developed for feminine wear, like "dew kiss", "crushed violet", "old burgundy" and "Fresno raisin". He's perfectly willing to keep up with the styles but knows his Jenny would never stand for the "nude" shade, for instance, now so popular for hats, stockings, etc.

Speedy Work on Hangars

On the evening of July 8, the officials of the P.R.T. Air Service, Inc., decided to erect immediately an air station building of the most modern type at Hoover Field, Washington, D.C., the southern terminal of the Philadelphia and Washington passenger air mail route. The field was to be inaugurated on July 15.

They called upon William E. Arthur & Co., Inc., to erect this building complete, ready for use, within five days.

At noontime on Friday, July 9, Mr. Arthur received a verbal order from the officials of the P.R.T. Air Service to proceed at once with the construction of the building. Speed being a part of the satisfactory service of his company, Mr. Arthur chartered a plane at Philadelphia and flew to Washington, starting delivery of materials for the work within two hours. By Saturday, July 10, at noontime, actual construction had started. On Thursday morning, July 15, at 11, the building was completed, but, on account of the heavy rains, inauguration of the field did not take place until July 16.

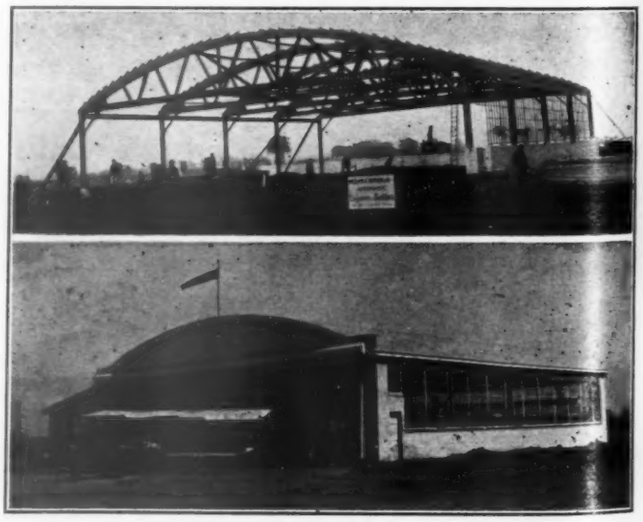
Below, the Hoover Field, Washington, building of the P.R.T. air service to Philadelphia, constructed by Wm. E. Arthur and Co. in five days under rush orders. Above is shown the manner in which rapid progress is insured by Mr. Arthur.

This speed in construction is remarkable inasmuch as the building is 54 ft. long, 23 ft. wide, and built of reinforced concrete foundations and floors, over which are placed wood sleepers and wood finished floors. The building has solid brick walls, throughout, Spanish tile roof, steel French casement windows, and is plastered with a special sand finish on the walls and ceilings. All plumbing and electrical service is complete.

The building consists of a baggage room and a U.S. Air Mail Department, private office and public telephone booth, waiting room for passengers with a souvenir and refreshment stand, well furnished rest rooms with a large Spanish piazza which enters on to a large terrace which was completely turfed within the time mentioned.

There are two large gates at the entrance of the terrace to the flying field, and these are so arranged that planes may be brought up to the open gates in such a position as to safeguard passengers entering the plane from injury by the propellers.

William E. Arthur & Co., Inc., are also building the most modern hangars in the country at this field.



These two photographs are of extreme interest as another example of speed work carried out by Wm. E. Arthur and Co. They represent, below, the completed hangar at the Buffalo Airport, constructed by Wm. E. Arthur and Co. and, above, the state of completion after nine days. The hangar, which is a steel and concrete structure, was completed and occupied after nineteen days of work. *See* AVIATION, *July 26, page 126.*

THE NEW SUPPLEMENT

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PAGE 15 OF OUR CATALOG

Listing instruments, dural sheets, dural tubes, dural rivets, screws and bolts, airplanes, motors, aluminum, sheets, tubing, rivets, pulleys, strainers, fittings, fabric and tapes and over

A New Safety Belt for $3.00

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FROM A PAGE IN OUR SUPPLEMENT

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AIRPORTS AND AIRWAYS

Office Boy Takes a Long Airplane Ride

The office boy is a pretty hard individual to squelch, at least so is the one in the employ of the National Air Transport, Inc., at Chicago. The youngster apparently had exhausted his supply of grandmothers in his endeavors to get away from the office in the afternoons to witness the White Sox or the Cubs play ball, or else baseball had palled on him. At any rate, he suddenly became obcessed with a wild desire to take an airplane ride. For downright persistency a youthful aviation enthusiast is in a class by himself. The N.A.T. office boy finally wore down the objections and settled himself comfortably among the mail bags in the mail compartment of the Curtiss Carrier Pigeon and waved to the pilot to "let 'er go". Moline, Ill., had no attractions. Nor did Kansas City. The boy stuck to his plane until Dallas, Tex., the terminus of the route, was reached.

After taking in the sights of Dallas and concluding that it was not quite so lively there as in "good old Chi", the youngster again settled himself in the mail compartment of a northbound Carrier Pigeon, and in due time reached Chicago.

Rochester, N. Y.

By M. B. Scales

The past week in Rochester, N. Y., has been marked in aviation circles by the opening of a new flying field, the beginning of a survey in view of establishing an air mail station, and the prohibiting, by Mayor O'Neil, of the "stunts" which were to be performed in the air over Britton Field.

The new field is the second to be opened in this city, the first being Britton Field from which four airplanes of the McDermott-Talaska Corp. are making flights. The new one is on Monroe Avenue, just outside the city limits. The operators are Spencer M. Punnett and Charles Wethern, who hail from the flying station at Daytona Beach, Fla. Mr. Punnett is the son of Milton B. Punnett of the Eastman Kodak Company, Rochester. It is the intention of the two young men to have a permanent sales and service field here and specialize in aerial photography and passenger carrying.

The first step in Mayor O'Neil's program for establishing an aerial mail station at Britton Field was taken when Harold W. Baker, commissioner of public works, Stephen B. Story, director of the Bureau of Municipal Research, and William J. O'Hea of the Chamber of Commerce, left for Cleveland to survey the landing station and flying field there. They will also visit Detroit. A survey will be made preparatory to providing facilities here.

More than 25,000 persons were gathered at Britton Field to witness feats in aerial acrobating which were to be performed by Charles J. Talaska and Victor Evans on a plane piloted by Lieut. R. S. Enslow. In view of the fact that Britton Field is city property, the order to stop the exhibition was made to protect the lives of those assembled. Charles Myers of Hagerstown, Md., representing a southern aircraft company, took the air in a Waco machine and did exhibition flying to take the place of the more dangerous stunts that had been proposed.

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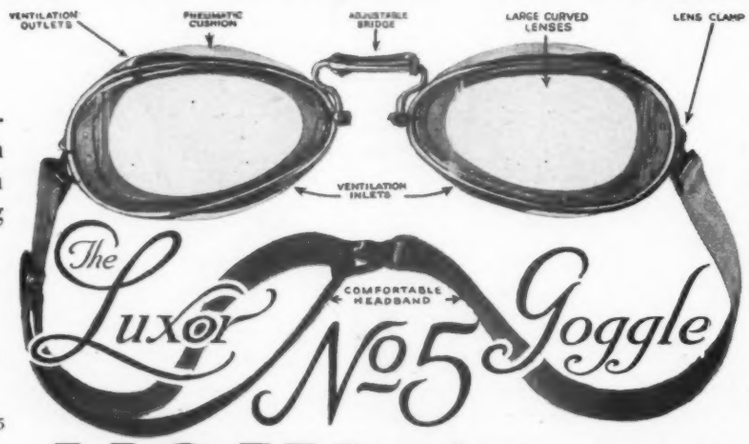

Comfortable, wide-vision goggles with correct ventilation preventing fogging or steaming

The adjustable bridge and pneumatic cushions assure comfort and perfect fit.

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With ground polished and cylindrical ben: white lenses $10.75

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Insist on Genuine LUXOR Goggles

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Wichita, Kan.

By Paul Hovegard

Both the factories, Swallow and Travel Air, are busy on their entries for the Ford Tour. The Swallow Company will race a Hisso plane and a Standard OX5 job. Travel Air pilots will fly the "Flying Showcase" sold to the Pioneer Instrument Company, powered with a Whirlwind, and another machine equipped with a Model E Hisso. Mr. Goldberg of the Pioneer Instrument Company is here putting the finishing touches on the instruments of the "showcase". Both the planes are equipped with brakes.

Despite the rivalry between camps in production of airplanes they show a friendly spirit toward each other. Clarence Clark, manager of the Municipal field, was up in the new Hisso Travel Air and stopped in to visit the Swallow field, when he was asked to fly the new Super Swallow.

The Swallow people are fast approaching the foolproof airplane. They have it at such a stage already that, after the plane leaves the factory, no mechanically inclined pilot or flight-inspired grease monkey can tamper with the rigging. It takes two welders, a small boy and a theologist to change it. (A theologist is one who tells people when they have done wrong.)

George Lyle of Lyle-Hoyt, Clover Field, Santa Monica, Calif. stopped in on his way to Pittsburg, Pa. He and Hoyt are doing well as Western coast distributors for the Travel Air.

New Field Opened at Akron

By F. Galloway

Akron Air Port has just been opened by B. E. Fulton and Hugh C. Robbins, commercial aviators. The new field is located four miles Southeast from the heart of the city. One half mile West of Springfield lake on Akron and Massillon road and one fourth mile from city limits. The new field is being equipped with hangar and shop. The runways have been put into shape. Gasoline and oil may be had at present and repair service within the next ten days. Robbins Flying Service headed by Hugh S. Robbins, has the commercial rights on field. Sergeant P. A. DeWeese, well-known parachute jumper will be associated with Robbins. The Babcock Airplane Co. will use field for test and demonstration.

An invitation is extended to cross country fliers to stop at this field. Also an invitation is extended to the Air Mail line to stop free of charge when they are on the Cleveland and Louisville Service.

Cleveland Airport, Ohio

By W. T. Whitlock

Many aeronautical celebrities have visited and praised Brook Park Field within a few days. Maj. Gen. Umberto Nobile who was so aptly termed as a modern Columbus by the Cleveland Plain Dealer, along with his mascot a fox terrier, Titina, many gorgeously uniformed mechanics, and a host of Italian admirers was guest of honor last Sunday. Maj. "Jack" Barry, field managr de luxe, piloted him about the hangars and showed him the efficient management of the mail, the civilian ships and maintenance. The General was deeply impressed with everything, from the ear to ear smile which graced his features.

Barry espied J. Paul Riddle who was visiting Cleveland, and asked him to give a little exhibition in his Waco. Incidentally Paul had been giving the ten thousand odd spectators the thrill of a lifetime by, (as Shirley Short said, "violating all aeronautical laws") in the fore mentioned Waco for the past three hours. However, Paul who positively despises stunting, sighed and took to the air. Far be it from me to attempt to describe his maneuvers. A streak would dive down to the ground, or so it seemed, then with a roar it would zoom straight up to the heavens. Rolls, spins, Immelman's loops, zooms, and well, let us include the complete aeronautical glossary.

General Nobile had walked away upon the request of Barry to inspect the flood lights a bit previous to Riddle's landing, and after due inspection asked where the wonderful pilot was, and finding that Paul had hied himself hence to the

Reliability

Another Travel Air Plane

equipped with Pioneer Instruments

IN FORD RELIABILITY TOUR

Here is a close-up of the ship built by Travel Air especially for the Pioneer Instrument Co. of New York. It is powered with a Wright Whirlwind motor and is being flown in the Ford Tour.

Fully equipped with Pioneer instruments, including the marvelous earth-inductor compass, this plane will be used by the Pioneer concern as a demonstrator.

In the front cock-pit is Walter Beech, General Manager of Travel Air, who will pilot the ship on the Ford Tour; the other gentleman is B. H. Goldsboro, Pioneer Company engineer, who will fly as passenger.

Correspondence Invited

TRAVEL AIR MFG. CO., WICHITA, KAN.

Light Commercial Planes *Special Models*

civilian throng without warning kissed upon both cheeks our own Jack Barry much to his mortification.

The globe circling writers, Edward Evans and Linton Wells, who established a new world's record for a round the world trip arrived at the airport on Aug. 25. Two army ships piloted by Capt. Thomas Boland and Lieut. Ralph E. Fisher brought the record seekers to Cleveland and hopped off a few moments later at the request of reporter Wells. The two thrill seekers criticized most severely the flying progress in our United States.

The Ford Tour pathfinder plane, a Douglas six-passenger transport, landed at Brook Park Field last week. It was piloted by Lieut. L. C. Elliott of Selfridge Field and carried as passengers H. G. McCarroll, manager of the Tour, E. P. Adams of the Aderaft Club, Ray Collins, referee, three newspaper men and William Ross, mechanic. This is the last stop before the end of the trip at Detroit.

Clyde Emerich of the Euclid Avenue Airport has been doing a great business in passenger flying. On Sunday he carried forty-nine passengers, and the next day fifty-five. Incidentally his Waco was instrumental in the recovery of a stolen sail boat. The owner of the boat came to the field and asked Emerich to fly along the lake front in hopes of locating the missing sloop. At a point along the shore he turned about and motioned to Clyde to nose down and when flying at about a hundred feet espied the cause of the quest. Another use for an aeroplane.

Willard Parker is forgetting how to use his legs. A Sunday to Willard is just a series of landings and takeoffs. One student hops from the cockpit and another takes his place. Cliff March suggested that Parker get a little lap board and have his lunch while the student is making turns.

We now must put in a word for Maj. "Jack" Barry. The success of the airport is due, to a great extent, to his untiring efforts. Every day will find Barry planning some improvement, some betterment for the good of the field. During his reign four thousand ships have landed at the field and not one has been delayed a minute from incompetency at the port.

Winning Plane Had Fairey-Reed Propeller

The D. H. Moth, piloted by Capt. Broad, which recently won the King's Cup Race, was fitted with a Fairey-Reed duralumin airscrew. The pilot reports that the extraordinarily high average speed maintained was a complete demonstration of the efficiency of the propeller, which stood up to over 16 hr. of full throttle, during which violent rainstorms were encountered.

Air Mail For Air Races

Announcement was made Aug. 7 by Postmaster General New that a special air mail service between Hadley Field, N.J., and the Sesquicentennial International Exposition in Philadelphia from Sept. 4 to 11 inclusive will be inaugurated when the National Air Races will be held at the Exposition. It is not definitely settled yet whether this service will be necessary on Sept. 5, which is Sunday. At a recent conference with the Postmaster General, Mr. Howard F. Wehrle, Managing Director of the National Air Races of 1926, requested the establishment of a special air route connecting the Overnight-Chicago and the Transcontinental Services with the Sesquicentennial Exposition for the dates mentioned.

The schedule has not as yet been arranged, but it will probably be made a two-a-day schedule, so as to connect with the regular schedule of the Overnight and the Transcontinental Services.

Opening of Aero Club of Columbus, Ohio

August 21 has been selected for the opening of the new club house and aviation center by the Aero Club of Columbus. The inauguration of this project will be celebrated by an aeronautic exhibition and air carnival at Norton Field.

ALL METAL

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A FAIR licensing plan under which a manufacturer may himself produce special parts under my patents is also available.

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B.B.T. 180° Landing Floodlight. The cut glass lighthouse lens with reflectors above, below and behind the light produces maximum efficiency.

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UNITED STATES AIR FORCES

Night Pursuit Problems

A series of interesting night pursuit problems were recently carried out in the vicinity of Langley Field and Fort Monroe, Va., the object being in general to determine the extent of cooperation which is possible and necessary between night pursuit airplanes in flight and searchlight units. An SE-5 airplane piloted by Capt. H. W. Cook, an NBS-1, piloted by 1st Lieut. K. N. Walker, and searchlight units from Ft. Monroe, Va., participated in the series of seven problems.

In each problem a definite area or objective was specified as the target of the attacking bomber, which in the different problems approached their objective at various altitudes. It was then the work of the searchlight units to locate the bomber and indicate its position to the pursuit pilots by holding the bomber in the intersection of the two beams. The pursuit plane was equipped with a blinker to be used in signalling to the searchlight units if the pilot desired the lights to go out of action after he had located the bomber. This system of communication operated efficiently and gave the desired results.

In the first problem the bomber was illuminated when at a distance of five miles from the objective and the pursuit plane in position to attack the bomber when the latter was still 2½ miles from the objective. The searchlights were signalled to go out of action and the pursuit pilot could still follow the bomber without the aid of the lights. During the simulated attack from below, the pursuit plane could easily be seen from the bomber, as the pursuit machine's wings were painted yellow.

An additional problem for the purpose of testing the efficiency of parachute flares in conjunction with searchlights was conducted in much the same general way as the first, but a faulty altimeter on the bomber resulted in the flares being dropped at a much lower altitude than had been planned.

Two of the problems were to test the efficiency of the combined action of anti-aircraft and night pursuit in repelling bombardment attacks at night, and to test the efficiency of the lights in revealing to the pursuit pilot the position of a bombardment plane in flight by placing diffused beams across and below the course of the bomber. Both of these problems gave data to the pilot which will be of value in the future.

A separate problem was flown for the special purpose of determining whether or not an observer in a bomber illuminated by ground searchlights could see an attacking pursuit plane. It was found that the attacking pursuit plane was normally not visible to the gunners in the bomber when the searchlights were continued in action on the bomber and was, therefore, not likely to be subjected to destructive fire from the bomber.

It was noted during the course of the problems that, with fair conditions of visibility, a bomber could be followed without the aid of searchlights. Once having been located by the aid of lights and under good visibility conditions the bomber could be located at night without artificial illumination.

The officers who conducted the problems feel that the information gained as a result of this work will be of considerable value to the Air Corps in planning night pursuit action against attacks by bombers.

DOPES

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VARNISHES ENAMELS

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ALL AMERICANS WHO DESIRE TO MAKE AMERICA FIRST IN THE AIR.

We seek, by the promotion and encouragement of civil and commercial air navigation, to contribute to national progress and prosperity and to increase the military safety of the country without giving cause for international jealousy or fear.

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Superior Performance with
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"The Plane That Pays A Profit"

New Standard J-1 Commercial

Designed, Converted and Assembled by
THE NICHOLAS BEAZLEY AIRPLANE CO.

Specifications

Span over all, upper and lower wings, 31 feet 6 inches. Chord 6 feet. Gap 6 feet. Dihedral 0 degrees. Sweepback 5 degrees. Stagger 7 inches. Weights with OX5 motor, empty without fuel, oil or water, 1275 pounds. Fuel 285 pounds. Pilot 170 pounds. Pay load 400 pounds. Total weight fully loaded 2130 pounds.

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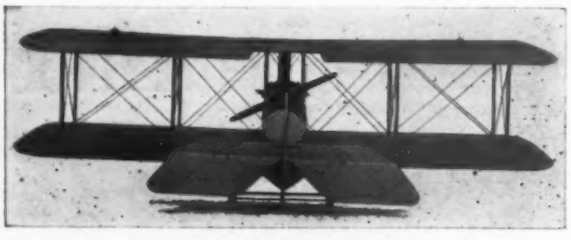

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Training at Langley Field

The summer training season at Langley Field, Va., which started on June 16 with the arrival of the 304th and 324th Observation Squadrons of the 79th and 99th Divisions, Organized Reserves, respectively, is now in full blast and is being attended with great success.

The Air Service R.O.T.C. Unit from the Massachusetts Institute of Technology arrived at Langley Field, June 18, 32 strong, for a period of training lasting until July 29. The camp schedule of other Reserve and National Guard units, follows. The 403rd and 502nd Pursuit Squadrons received training from July 2 to 16, the 482nd Bombardment Squadron from July 17 to 31; the 103rd Observation Squadron, Pennsylvania National Guard, from July 24 to Aug. 17; the 355th Balloon Company from July 31 to Aug. 14; the 29th Division Air Service; Maryland National Guard, from Aug. 1 to Aug. 15, and the 101st Observation Squadron, Massachusetts National Guard.

During the training period from June 16 to Aug. 28 there will be at Langley Field a total of 211 Reserve and National Guard Officers, 233 enlisted men of the Reserve Corps and National Guard and 32 R.O.T.C. cadets.

The system of training used is similar to that of last year, which was very successful, and it is expected that excellent results of the training will be obtained again this year.

Kentucky Sign Posts for Air

Adjt. Gen. J. A. Kehoe, of the Kentucky National Guard, will have strategic cities roofs numbered for quick locality recognition from the air.

The State air board has supervision in Kentucky over establishment and maintenance of air ports, routes and aviation fields. This enables cities and counties to maintain ports and fields in conjunction with each other.

Airship Flights at Scott Field, Ill.

During the period June 28 to July 10, a total of 218 hr., 39 min. were flown in various types of lighter-than-air craft at Scott Field, Ill., as follows: TA ships, 80½ hr.; TC ships, 111 hr., 20 min.; TS-1, 20 hr., 45 min.; free balloons, 6 hr., 4 min. The man hours totaled 1133 hr. 45 min. in lighter-than-air and 55 hr. 10 min. in heavier-than-air craft.

The summer schedule now being in effect, night flying is the order. Weather permitting, the airships leave the hangar at 6:00 p. m. and remain out until midnight. The six-hour period is broken into three flights to allow the maximum number of the personnel to fly.

An unusual event in the history of lighter-than-air aviation in this country recently occurred at Scott Field, Ill., when seven airships were in the air at one time—the first time that number of lighter-than-air ships were ever assembled at one place in this country in actual flight.

Washington, D. C. to San Antonio, Tex., in One Day

Washington, D. C., to San Antonio, Tex., in one day, is the record of Maj. Carl Spatz, on duty in the office of the Chief of the Air Corps, Washington, who left Bolling Field at 5:10 o'clock on the morning of July 20 and arrived at Kelly Field, San Antonio, Tex. at 7:30 p. m.

Major Spatz flew one of the new Curtiss single-seater D-1 pursuit planes. The distance is 1,600 miles, and the route followed was Bolling Field; Wright Field, Ohio; Scott Field, Ill.; Muskogee, Okla., and Kelly Field.

Alaskan Air Survey Progresses

The commander of the Naval Alaskan Aerial Survey Expedition, Lieutenant Wyatt, U.S.N., has reported that the aerial mapping of Revillagigeo, Annette, and Gravin Islands, with the Cleveland Peninsula, has been completed. Revillagigeo is the largest and most important island in the southern group of inshore islands.

The planes engaged in this work were then flown to Petersburg and Wrangel in order to secure a proper location for a new base.

Field at Charleston Navy Yard

The sum of $12,000 was allocated on July 23 for the establishment of a new flying field at the Charleston S.C. Navy Yard.

The field will be approximately 400 ft. wide and 1500 ft. long. It will provide facilities for land planes at the Navy Yard. From its position it is expected that this new field will be much used, when completed, by planes proceeding up and down the Atlantic Coast. No shops, hangars, or quarters will be provided, but gas and oil facilities will be available.

The establishment of this field is in accordance with the policy approved by the Secretary of the Navy for the establishment of landing fields at all Navy Yards.

The field is expected to be finished not later than Jan. 1, 1927. It will be available for the use of civilian flyers in accordance with the policy of the Bureau of Aeronautics to co-operate with civilian aviators whenever it will not interfere with naval aerial operations.

Navy Air Orders

Lieut. Comdr. Harry R. Bogusch det. aide and flag sec'y on staff, Dest. Sqdns., Battle Flt., to Nav. A. Sta., Pensacola.

Lieut. Comdr. Charles G. McCord det. U.S.S. Wright to Nav. A. Sta., Pensacola.

Lieut. Comdr. Thomas Shine det. U.S.S. Wright to Nav. A. Sta., Pensacola.

Lieut. Troy N. Thweatt's orders revoked, to continue duty Nav. A. Sta., Nav. Oper. Base, Hampton Roads.

Lieut. Comdr. Harold E. Snow det. Nav. Acad., to temp. duty. Nav. A. Sta., Pensacola.

Lieut. Lyman C. Avery det. Off. Nav. Intel., to Nav. A. Sta., Pensacola.

Lieut. Comdr. Raymond G. Thomas det. Edgewood Arsenal, Edgewood, Md., to temp. duty Navy A. Sta., Pensacola.

Ch. Mach. Mark A. Savelle det. Aircf. Sqdns., Battle Flt., to Nav. A. Sta., Hampton Roads.

Ens. Clinton H. F. Folger det. Rec. Ship, New York, to temp. duty, Nav. A. Sta., Pensacola.

Ens. Kenneth P. Hartman det. Nav. A. Sta., Pensacola, to U.S.S. Texas.

Ens. Ephriam R. McLean det. U.S.S. Rochester, to temp. duty Nav. A. Sta., Pensacola.

Army Air Orders

Capt. Calvin E. Giffin, Air Corps, relieved from observation and treatment, Mayo Clinic, Rochester, Minn., to San Francisco, report to com. off. Letterman Gen. Hosp. for observation and treatment.

Following officers, Air Corps, will proceed to Air Corps Prim. Fly. Sch., Brooks Field, from places indicated: Turner Ashby Sims, Little Rock, Alfred Henry Johnson, Donnybrook, Robert Eugene Mousseau, des Islets, Shelton Ezra Prudhomme, Oberlin.

William Murlin Creasy, Jr., Air Corps, Wilmington, N.C., and Samuel Russ Harris, Jr., Air Corps, Washington, upon expiration of leave of absence, to Brooks Field.

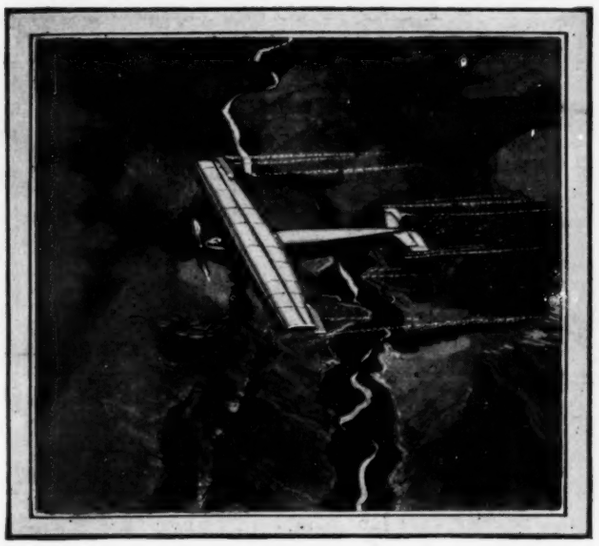
Maj. Henry B. Clagett, Air Corps, Bolling Field, to the Presidio, San Francisco.

Following officers of the Air Corps, to Brooks Field, from places indicated, upon expiration of leave of absence: Holger Nelson Toftoy, Corvallis, Edward Davis Raneym, Jr., Beaufort, Benjamin Peter Yeomens, Syracuse, Charles Winchell, McGeehan, Kansas City, John Prichard Woodbridge, Newark, Ohio, Morris Robert Nelson, Cordyon, James Bell Burwell, Charlotte, Marvin John McKinney, Cuyahoga Falls, Ohio, William Benjamin Hawthorne, Harrisburg.

Second Division, Air Corps, 12 Observation Squad. Photo Section, from Biggs Field, to Fort Sam Houston.

Eighth Attack Squad., 90th Attack Squad., 60th Serv. Squad., Kelly Field, to Fort Crockett.

Eighteenth Airship Co., Scott Field, to active Assoc., 24th Airship Serv. Co.



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With Wright J-4,		With OX-5,	
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Minimum speed	42 M.P.H.	Minimum speed	38 M.P.H.
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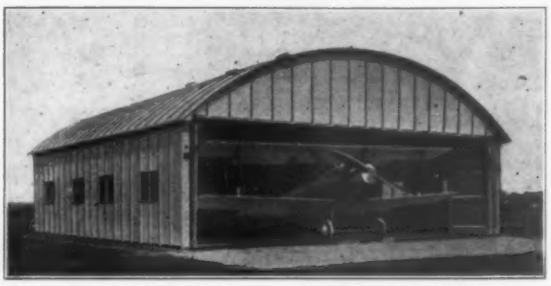

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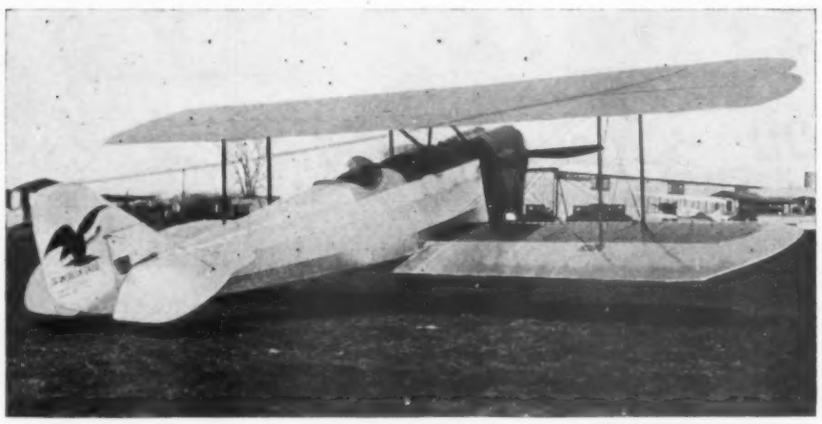

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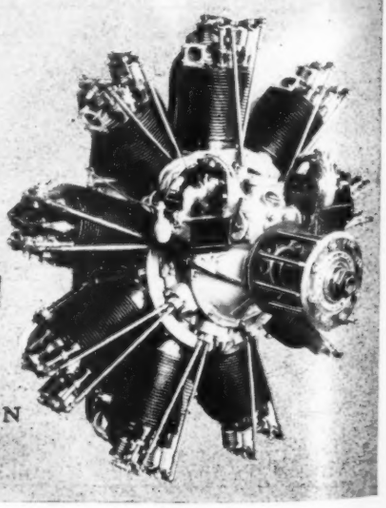

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